

## **CASE NARRATIVE**

### **Monthly Data Gelman Sciences**

### **Project: 1,4-Dioxane Remediation**

### **Date: February 2022**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition, all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Gelman Sciences Inc. attests to the validity of the laboratory data generated by Gelman Sciences Ann Arbor, Michigan Environmental Laboratory facilities reported herein. All analyses performed by Gelman Science's Environmental Laboratory facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Gelman Science's Environmental group has reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

At the end of the month some of the 1,4-dioxane samples were sent to Ann Arbor Technical Services for analysis due to a reproducibility problem. The balance of the samples was analyzed for 1,4-dioxane at Gelman Science's Environmental Laboratory. All bromate samples were analyzed by Gelman Science's Environmental Laboratory. The test results in this report meet all NELAP requirements for parameters for which accreditation are required or available. Any exceptions to NELAP requirements are noted in this report. All exceptions are noted per laboratory standard operating procedure based on EPA Method 1624c. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results. The odd even rule is used for rounding. Holding times were met for all samples analyzed. Proper preservation was observed on all samples unless otherwise detailed in the individual sections below. Samples MW-54d, 72d, and 71 were recollected due to questionable results.

## **RECEIPT/ STORAGE**

The samples were received on the days noted in the report for the Month; the samples arrived in good condition, properly preserved and on ice when necessary. Samples that require 1,4-dioxane analysis are collected in hydrochloric HCl acid-preserved vials to a pH of  $\leq 2$ , except for the Pall ozone treatment samples. These samples have chemicals that, when mixed with the HCl acid, cause interferences and trap damage. Every attempt is made to analyze these samples within 24 hours of receipt.

Samples that require Bromate analysis are collected and preserved in the laboratory with ethylene di-amine and refrigerated.

Samples that are delivered to the laboratory the same day as they are collected are likely not to have reached a fully chilled temperature. This is acceptable as long as there is evidence that chilling has begun. All samples are iced or refrigerated at 4°C ( $\pm 2^\circ\text{C}$ ) from the time of collection until sample preparation or analysis.

## **1,4-Dioxane (GC-MS)**

All ground water and treated water samples were analyzed for 1,4-Dioxane (GC-MS) in accordance with EPA 1624C, which has been modified to enhance detection limits. Samples that were diluted to bring them within the calibrated range of the instrument are noted with a "D" under the Qualifier Code section of the data report. Reporting limits were adjusted based on each dilution.

Reporting limit for undiluted samples is 1ppb (part per billion, micrograms per liter, µg/L). All quality control parameters were within the acceptance limits for reported samples unless indicated.

## **Bromate (Ion Chromatography)**

All surface water and treated samples were analyzed for Bromate (Ion Chromatography) in accordance with EPA 300.1. Surrogates are added to all samples. All quality control parameters were within the acceptance limits with the balance of sample analyzed.

The reporting limit for treated samples is 5.0ppb and for surface samples is 2.0ppb.

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## **Qualifiers**

### **1,4-Dioxane Qualifier Codes:**

<i>Qualifier Code</i>	<i>Description</i>
nd:	The compound was analyzed for, but not detected at or above the detection limit indicated.
D:	Analyte value quantified from a dilution; reporting limit is raised to reflect dilution.
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve, reported as estimate.
B:	The sample vials contained air bubbles larger than 5mm, which may affect compound results.
J:	The compound was positively identified; the associated numerical value is the approximate concentration.
M:	Matrix effects, sample required dilution.
R:	The reported value is unusable and rejected due to variance from quality control criteria.
V:	The reported value is considered estimated due to variance from quality control criteria.
H:	Sample was analyzed past 14-day hold time, but within 45 days.
O:	Samples analyzed in outside laboratory.
S:	Samples split with DEQ.

### **Bromate Qualifier Codes:**

<i>Qualifier Code</i>	<i>Description</i>
nd:	The compound was analyzed but was not detected at or above the detection limit indicated.
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve.
J:	The compound was positively identified; the associated numerical value is the approximate concentration.
R:	The reported value is unusable and rejected due to variance from quality control criteria.
V:	The reported value is considered estimated due to variance from quality control criteria.
H:	Sample was analyzed past 28-day hold time

Analyst: Gage M. Trendel



Date: 3/10/22

Report Checked by: Ray Woods



Date: 3/10/22



## Sample Analysis Report

642 South Wagner Road  
Ann Arbor, MI 48103-9019 US  
734.436.4025 phone

February, 2022

Analyst Initials: GM  
Date: 3/22/22

[illegible]

[illegible]

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
MW-103s-02-14-22-14:47-1	83	1.0						O
MW-105d-02-07-22-13:08-1	170	10						O,D
MW-106s-02-15-22-14:00-1	280	20						O,D
MW-108d-02-07-22-10:04-1	540	10						O,D
MW-108s-02-07-22-11:13-1	260	10						O,D
MW-112i-02-14-22-12:18-1	10	1.0						O
MW-112s-02-14-22-13:29-1	3	1.0						O
MW-121d-02-21-22-10:01-1	2	1.0						O
MW-124d-02-22-22-09:20-1	nd	1.0						O
MW-142d-02-28-22-10:14-1	nd	1.0						O
MW-143d-02-28-22-13:13-1	nd	1.0						O
MW-64-02-01-22-10:52-1	39	1.0						O
MW-76i-02-15-22-10:33-1	100	1.0						O,D
MW-76s-02-15-22-09:23-1	310	5						O
MW-81-02-15-22-12:03-1	150	5						O,D
MW-84s-02-10-22-13:53-1	280	10						O,D
<b>SW</b>								
MW-10d-02-24-22-10:06-1	16	1.0						O
MW-57-02-24-22-08:44-1	5	1.0						O
<b>Surface Water</b>								
<b>Not Applicable</b>								
HC/HR-02-01-22-08:50-1			nd	2.0				
HC/HR-02-02-22-09:50-1			nd	2.0				
HC/HR-02-03-22-09:55-1			nd	2.0				
HC/HR-02-04-22-10:00-1			nd	2.0				
HC/HR-02-07-22-10:25-1			nd	2.0				



Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
HC/HR-02-08-22-10:25-1			nd	2.0				
HC/HR-02-09-22-10:20-1			nd	2.0				
HC/HR-02-10-22-09:20-1			nd	2.0				
HC/HR-02-11-22-10:30-1			nd	2.0				
HC/HR-02-14-22-09:50-1			nd	2.0				
HC/HR-02-15-22-10:15-1			nd	2.0				
HC/HR-02-16-22-09:50-1			nd	2.0				
HC/HR-02-17-22-09:50-1			nd	2.0				
HC/HR-02-18-22-10:00-1			nd	2.0				
HC/HR-02-21-22-09:20-1			nd	2.0				
HC/HR-02-22-22-09:20-1			nd	2.0				
HC/HR-02-23-22-10:50-1			nd	2.0				
HC/HR-02-24-22-10:00-1			nd	2.0				
HC/HR-02-25-22-10:20-1			nd	2.0				
HC/HR-02-28-22-11:00-1			nd	2.0				

## Treatment System

OUTFALL-02-01-22-1	6	1.0						O
OUTFALL-02-01-22-2			9.7	5.0				
OUTFALL-02-02-22-1	6	1.0						O
OUTFALL-02-02-22-2			nd	5.0				
OUTFALL-02-03-22-1	5	1.0						O
OUTFALL-02-03-22-2			nd	5.0				
OUTFALL-02-06-22-1	5	1.0						O
OUTFALL-02-06-22-2			nd	5.0				
OUTFALL-02-07-22-1	6	1.0						O
OUTFALL-02-07-22-2			5.2	5.0				
OUTFALL-02-08-22-1	6	1.0						O

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-02-08-22-2			6.6	5.0				
OUTFALL-02-09-22-1	5	1.0						O
OUTFALL-02-09-22-2			nd	5.0				
OUTFALL-02-10-22-1	5	1.0						O
OUTFALL-02-10-22-2			5.8	5.0				
OUTFALL-02-13-22-1	6	1.0						O
OUTFALL-02-13-22-2			nd	5.0				
OUTFALL-02-14-22-1	7	1.0						O
OUTFALL-02-14-22-2			6.0	5.0				
OUTFALL-02-15-22-1	6	1.0						O
OUTFALL-02-15-22-2			nd	5.0				
OUTFALL-02-16-22-1	6	1.0						O
OUTFALL-02-16-22-2			5.0	5.0				
OUTFALL-02-17-22-1	5	1.0						O
OUTFALL-02-17-22-2			6.2	5.0				
OUTFALL-02-20-22-1	6	1.0						O
OUTFALL-02-20-22-2			nd	5.0				
OUTFALL-02-21-22-1	6	1.0						O
OUTFALL-02-21-22-2			5.1	5.0				
OUTFALL-02-22-22-1	6	1.0						O
OUTFALL-02-22-22-2			nd	5.0				
OUTFALL-02-23-22-1	5	1.0						O
OUTFALL-02-23-22-2			nd	5.0				
OUTFALL-02-24-22-1	6	1.0						O
OUTFALL-02-24-22-2			6.8	5.0				
OUTFALL-02-27-22-1	5	1.0						O
OUTFALL-02-27-22-2			6.0	5.0				

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-02-28-22-1	6	1.0						O
OUTFALL-02-28-22-2			6.0	5.0				
Red Pond-02-01-22-07:05-1	390	40						O,D
Red Pond-02-02-22-07:00-1	400	40						O,D
Red Pond-02-03-22-07:30-1	340	10						O,D
Red Pond-02-04-22-07:45-1	380	40						O,D
Red Pond-02-07-22-07:10-1	380	40						O,D
Red Pond-02-08-22-07:35-1	370	10						O,D
Red Pond-02-09-22-07:35-1	370	40						O,D
Red Pond-02-10-22-07:00-1	360	40						O,D
Red Pond-02-11-22-07:30-1	380	40						O,D
Red Pond-02-14-22-07:15-1	390	40						O,D
Red Pond-02-15-22-08:55-1	390	40						O,D
Red Pond-02-16-22-08:45-1	370	10						O,D
Red Pond-02-17-22-07:40-1	390	40						O,D
Red Pond-02-18-22-08:00-1	390	10						O,D
Red Pond-02-21-22-07:20-1	410	40						O,D
Red Pond-02-22-22-07:10-1	410	40						O,D
Red Pond-02-23-22-07:35-1	420	40						O,D
Red Pond-02-24-22-07:10-1	420	40						O,D
Red Pond-02-25-22-07:30-1	360	10						O,D
Red Pond-02-28-22-07:30-1	440	40						O,D





## 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	G001-002.22	Percent Moisture	100.0
ATS SDG Number	0216221	Instrument	2100V
Client Sample ID	MW-76i	Subsample (mL)	5.000
Laboratory Sample ID	0216221-4	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	02/15/2022 10:33	Basis	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
QC Batch Number	QCORG0216221	Analysis Date	02/16/2022 16:16:48

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.10	0.001		

### Comments

All methods reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project specific reporting limit (MDL) based upon lowest calibration standard.  
M - Indicates elevated reporting limit based upon sample dilution.



## 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	G001-002.22	Percent Moisture	100.0
ATS SDG Number	0216221	Instrument	2100V
Client Sample ID	MW-76s	Subsample (mL)	5.000
Laboratory Sample ID	0216221-3	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	5
Sample Date	02/15/2022 9:23	Basis	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
QC Batch Number	QCOR0216221	Analysis Date	02/16/2022 11:53:48

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.31	0.005		M

### Comments

All methods reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project specific reporting limit (MDL) based upon lowest calibration standard.  
M - Indicates elevated reporting limit based upon sample dilution.





**Prepared By:**  
Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, MI 48103

Lab Sample ID	Analysis Date	Analysis Time	Sample Weight	Gas	Sample Concentration	Zone	Measured Concentration	Unit	Recovery	UCL	LCL	Comments
4519-2-3	8/14/00	14:20	0.364	8.802	0.21	0.05	0.05	0.05	101	0.3	0.27	

only 10% of the time with every 10th biopsy case as positive.  
positive results found only among 10% of the biopsy specimens  
examined. It was concluded that the biopsy results were not  
reliable.



Method	USDA 1524
QA/QC Batch Number	GC000202223
Q3	GC022231
Assigned Number	GC001-002.72
Report Date	2/7/2022

Lab Sample ID	Analyte Desc	Analyte Name	GLS	Sample Concentration	Spike Amount	Measured Concentration	Unspiked Ratio	Spiked Ratio	Percent Recovery	UCL	LCL	Comment
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Journal of Internal Medicine 247: 395–402

AT&T

US EPA 1824	US EPA 1824
OCORG-202221	OCORG-202221
632221	632221
60014C2.22	60014C2.22
2.7.2022	2.7.2022

Abate Spine (N1) / Metric Spine Duplicate (MSD)	PA5	PA6	PA7	PA8	PA9	PA10	PA11	PA12	PA13	PA14	PA15	PA16	PA17	PA18	PA19	PA20	PA21	PA22	PA23	PA24	PA25	PA26	PA27	PA28	PA29	PA30	PA31	PA32	PA33	PA34	PA35	PA36	PA37	PA38	PA39	PA40	PA41	PA42	PA43	PA44	PA45	PA46	PA47	PA48	PA49	PA50	PA51	PA52	PA53	PA54	PA55	PA56	PA57	PA58	PA59	PA60	PA61	PA62	PA63	PA64	PA65	PA66	PA67	PA68	PA69	PA70	PA71	PA72	PA73	PA74	PA75	PA76	PA77	PA78	PA79	PA80	PA81	PA82	PA83	PA84	PA85	PA86	PA87	PA88	PA89	PA90	PA91	PA92	PA93	PA94	PA95	PA96	PA97	PA98	PA99	PA100	PA101	PA102	PA103	PA104	PA105	PA106	PA107	PA108	PA109	PA110	PA111	PA112	PA113	PA114	PA115	PA116	PA117	PA118	PA119	PA120	PA121	PA122	PA123	PA124	PA125	PA126	PA127	PA128	PA129	PA130	PA131	PA132	PA133	PA134	PA135	PA136	PA137	PA138	PA139	PA140	PA141	PA142	PA143	PA144	PA145	PA146	PA147	PA148	PA149	PA150	PA151	PA152	PA153	PA154	PA155	PA156	PA157	PA158	PA159	PA160	PA161	PA162	PA163	PA164	PA165	PA166	PA167	PA168	PA169	PA170	PA171	PA172	PA173	PA174	PA175	PA176	PA177	PA178	PA179	PA180	PA181	PA182	PA183	PA184	PA185	PA186	PA187	PA188	PA189	PA190	PA191	PA192	PA193	PA194	PA195	PA196	PA197	PA198	PA199	PA200	PA201	PA202	PA203	PA204	PA205	PA206	PA207	PA208	PA209	PA210	PA211	PA212	PA213	PA214	PA215	PA216	PA217	PA218	PA219	PA220	PA221	PA222	PA223	PA224	PA225	PA226	PA227	PA228	PA229	PA230	PA231	PA232	PA233	PA234	PA235	PA236	PA237	PA238	PA239	PA240	PA241	PA242	PA243	PA244	PA245	PA246	PA247	PA248	PA249	PA250	PA251	PA252	PA253	PA254	PA255	PA256	PA257	PA258	PA259	PA260	PA261	PA262	PA263	PA264	PA265	PA266	PA267	PA268	PA269	PA270	PA271	PA272	PA273	PA274	PA275	PA276	PA277	PA278	PA279	PA280	PA281	PA282	PA283	PA284	PA285	PA286	PA287	PA288	PA289	PA290	PA291	PA292	PA293	PA294	PA295	PA296	PA297	PA298	PA299	PA300	PA301	PA302	PA303	PA304	PA305	PA306	PA307	PA308	PA309	PA310	PA311	PA312	PA313	PA314	PA315	PA316	PA317	PA318	PA319	PA320	PA321	PA322	PA323	PA324	PA325	PA326	PA327	PA328	PA329	PA330	PA331	PA332	PA333	PA334	PA335	PA336	PA337	PA338	PA339	PA340	PA341	PA342	PA343	PA344	PA345	PA346	PA347	PA348	PA349	PA350	PA351	PA352	PA353	PA354	PA355	PA356	PA357	PA358	PA359	PA360	PA361	PA362	PA363	PA364	PA365	PA366	PA367	PA368	PA369	PA370	PA371	PA372	PA373	PA374	PA375	PA376	PA377	PA378	PA379	PA380	PA381	PA382	PA383	PA384	PA385	PA386	PA387	PA388	PA389	PA390	PA391	PA392	PA393	PA394	PA395	PA396	PA397	PA398	PA399	PA400	PA401	PA402	PA403	PA404	PA405	PA406	PA407	PA408	PA409	PA410	PA411	PA412	PA413	PA414	PA415	PA416	PA417	PA418	PA419	PA420	PA421	PA422	PA423	PA424	PA425	PA426	PA427	PA428	PA429	PA430	PA431	PA432	PA433	PA434	PA435	PA436	PA437	PA438	PA439	PA440	PA441	PA442	PA443	PA444	PA445	PA446	PA447	PA448	PA449	PA450	PA451	PA452	PA453	PA454	PA455	PA456	PA457	PA458	PA459	PA460	PA461	PA462	PA463	PA464	PA465	PA466	PA467	PA468	PA469	PA470	PA471	PA472	PA473	PA474	PA475	PA476	PA477	PA478	PA479	PA480	PA481	PA482	PA483	PA484	PA485	PA486	PA487	PA488	PA489	PA490	PA491	PA492	PA493	PA494	PA495	PA496	PA497	PA498	PA499	PA500	PA501	PA502	PA503	PA504	PA505	PA506	PA507	PA508	PA509	PA510	PA511	PA512	PA513	PA514	PA515	PA516	PA517	PA518	PA519	PA520	PA521	PA522	PA523	PA524	PA525	PA526	PA527	PA528	PA529	PA530	PA531	PA532	PA533	PA534	PA535	PA536	PA537	PA538	PA539	PA540	PA541	PA542	PA543	PA544	PA545	PA546	PA547	PA548	PA549	PA550	PA551	PA552	PA553	PA554	PA555	PA556	PA557	PA558	PA559	PA560	PA561	PA562	PA563	PA564	PA565	PA566	PA567	PA568	PA569	PA570	PA571	PA572	PA573	PA574	PA575	PA576	PA577	PA578	PA579	PA580	PA581	PA582	PA583	PA584	PA585	PA586	PA587	PA588	PA589	PA590	PA591	PA592	PA593	PA594	PA595	PA596	PA597	PA598	PA599	PA600	PA601	PA602	PA603	PA604	PA605	PA606	PA607	PA608	PA609	PA610	PA611	PA612	PA613	PA614	PA615	PA616	PA617	PA618	PA619	PA620	PA621	PA622	PA623	PA624	PA625	PA626	PA627	PA628	PA629	PA630	PA631	PA632	PA633	PA634	PA635	PA636	PA637	PA638	PA639	PA640	PA641	PA642	PA643	PA644	PA645	PA646	PA647	PA648	PA649	PA650	PA651	PA652	PA653	PA654	PA655	PA656	PA657	PA658	PA659	PA660	PA661	PA662	PA663	PA664	PA665	PA666	PA667	PA668	PA669	PA670	PA671	PA672	PA673	PA674	PA675	PA676	PA677	PA678	PA679	PA680	PA681	PA682	PA683	PA684	PA685	PA686	PA687	PA688	PA689	PA690	PA691	PA692	PA693	PA694	PA695	PA696	PA697	PA698	PA699	PA700	PA701	PA702	PA703	PA704	PA705	PA706	PA707	PA708	PA709	PA710	PA711	PA712	PA713	PA714	PA715	PA716	PA717	PA718	PA719	PA720	PA721	PA722	PA723	PA724	PA725	PA726	PA727	PA728	PA729	PA730	PA731	PA732	PA733	PA734	PA735	PA736	PA737	PA738	PA739	PA740	PA741	PA742	PA743	PA744	PA745	PA746	PA747	PA748	PA749	PA750	PA751	PA752	PA753	PA754	PA755	PA756	PA757	PA758	PA759	PA760	PA761	PA762	PA763	PA764	PA765	PA766	PA767	PA768	PA769	PA770	PA771	PA772	PA773	PA774	PA775	PA776	PA777	PA778	PA779	PA780	PA781	PA782	PA783	PA784	PA785	PA786	PA787	PA788	PA789	PA790	PA791	PA792	PA793	PA794	PA795	PA796	PA797	PA798	PA799	PA800	PA801	PA802	PA803	PA804	PA805	PA806	PA807	PA808	PA809	PA810	PA811	PA812	PA813	PA814	PA815	PA816	PA817	PA818	PA819	PA820	PA821	PA822	PA823	PA824	PA825	PA826	PA827	PA828	PA829	PA830	PA831	PA832	PA833	PA834	PA835	PA836	PA837	PA838	PA839	PA840	PA841	PA842	PA843	PA844	PA845	PA846	PA847	PA848	PA849	PA850	PA851	PA852	PA853	PA854	PA855	PA856	PA857	PA858	PA859	PA860	PA861	PA862	PA863	PA864	PA865	PA866	PA867	PA868	PA869	PA870	PA871	PA872	PA873	PA874	PA875	PA876	PA877	PA878	PA879	PA880	PA881	PA882	PA883	PA884	PA885	PA886	PA887	PA888	PA889	PA890	PA891	PA892	PA893	PA894	PA895	PA896	PA897	PA898	PA899	PA900	PA901	PA902	PA903	PA904	PA905	PA906	PA907	PA908	PA909	PA910	PA911	PA912	PA913	PA914	PA915	PA916	PA917	PA918	PA919	PA920	PA921	PA922	PA923	PA924	PA925	PA926	PA927	PA928	PA929	PA930	PA931	PA932	PA933	PA934	PA935	PA936	PA937	PA938	PA939	PA940	PA941	PA942	PA943	PA944	PA945	PA946	PA947	PA948	PA949	PA950	PA951	PA952	PA953	PA954	PA955	PA956	PA957	PA958	PA959	PA960	PA961	PA962	PA963	PA964	PA965	PA966	PA967	PA968	PA969	PA970	PA971	PA972	PA973	PA974	PA975	PA976	PA977	PA978	PA979	PA980	PA981	PA982	PA983	PA984	PA985	PA986	PA987	PA988	PA989	PA990	PA991	PA992	PA993	PA994	PA995	PA996	PA997	PA998	PA999	PA1000	PA1001	PA1002	PA1003	PA1004	PA1005	PA1006	PA1007	PA1008	PA1009	PA1010	PA1011	PA1012	PA1013	PA1014	PA1015	PA1016	PA1017	PA1018	PA1019	PA1020	PA1021	PA1022	PA1023	PA1024	PA1025	PA1026	PA1027	PA1028	PA1029	PA1030	PA1031	PA1032	PA1033	PA1034	PA1035	PA1036	PA1037	PA1038	PA1039	PA1040	PA1041	PA1042	PA1043	PA1044	PA1045	PA1046	PA1047	PA1048	PA1049	PA1050	PA1051	PA1052	PA1053	PA1054	PA1055	PA1056	PA1057	PA1058	PA1059	PA1060	PA1061	PA1062	PA1063	PA1064	PA1065	PA1066	PA1067	PA1068	PA1069	PA1070	PA1071	PA1072	PA1073	PA1074	PA1075	PA1076	PA1077	PA1078	PA1079	PA1080	PA1081	PA1082	PA1083	PA1084	PA1085	PA1086	PA1087	PA1088	PA1089	PA1090	PA1091	PA1092	PA1093	PA1094	PA1095	PA1096	PA1097	PA1098	PA1099	PA1100	PA1101	PA1102	PA1103	PA1104	PA1105	PA1106	PA1107	PA1108	PA1109	PA1110	PA1111	PA1112	PA1113	PA1114	PA1115	PA1116	PA1117	PA1118	PA1119	PA1120	PA1121	PA1122	PA1123	PA1124	PA1125	PA1126	PA1127	PA1128	PA1129	PA1130	PA1131	PA1132	PA1133	PA1134	PA1135	PA1136	PA1137	PA1138	PA1139	PA1140	PA1141	PA1142	PA1143	PA1144	PA1145	PA1146	PA1147	PA1148	PA1149	PA1150	PA1151	PA1152	PA1153	PA1154	PA1155	PA1156	PA1157	PA1158	PA1159	PA1160	PA1161	PA1162	PA1163	PA1164	PA1165	PA1166	PA1167	PA1168	PA1169	PA1170	PA1171	PA1172	PA1173	PA1174	PA1175	PA1176	PA1177	PA1178	PA1179	PA1180	PA1181	PA1182	PA1183	PA1184	PA1185	PA1186	PA1187	PA1188	PA1189	PA1190	PA1191	PA1192	PA1193	PA1194	PA1195	PA1196	PA1197	PA1198	PA1199	PA1200	PA1201	PA1202	PA1203	PA1204	PA1205	PA1206	PA1207	PA1208	PA1209	PA1210	PA1211	PA1212	PA1213	PA1214	PA1215	PA1216	PA1217	PA1218	PA1219	PA1220	PA1221	PA1222	PA1223	PA1224	PA1225	PA1226	PA1227	PA1228	PA1229	PA1230	PA1231	PA1232	PA1233	PA1234	PA1235	PA1236	PA1237	PA1238	PA1239	PA1240	PA1241	PA1242	PA1243	PA1244	PA1245	PA1246	PA1247	PA1248	PA1249	PA1250	PA1251	PA1252	PA1253	PA1254	PA1255	PA1256	PA1257	PA1258	PA1259	PA1260	PA1261	PA1262	PA1263	PA1264	PA1265	PA1266	PA1267	PA1268	PA1269	PA1270	PA1271	PA1272	PA1273	PA1274	PA1275	PA1276	PA1277	PA1278	PA1279	PA1280	PA1281	PA1282	PA1283	PA1284	PA1285	PA1286	PA1287	PA1288	PA1289	PA1290	PA1291	PA1292	PA1293	PA1294	PA1295	PA1296	PA1297	PA1298	PA1299	PA1300	PA1301	PA1302	PA1303	PA1304	PA1305	PA1306	PA1307	PA1308	PA1309	PA1310	PA1311	PA1312	PA1313	PA1314	PA1315	PA1316	PA1317	PA1318	PA1319	PA1320	PA1321	PA1322	PA1323	PA1324	PA1325	PA1326	PA1327	PA1328	PA1329	PA1330	PA1331	PA1332	PA1333	PA1334	PA1335	PA1336	PA1337	PA1338	PA1339	PA1340	PA1341	PA1342	PA1343	PA1344	PA1345	PA1346	PA1347	PA1348	PA1349	PA1
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Journal of Internal Medicine 247: 105-112

## 6061-485.21/0N 5/03/21/4

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Michigan Laboratory ID: 9404  
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**Project Description:** This data report contains the results of 14 water samples, received by ATS on February 3, 2022 to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratories, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

Recipient: Mr. Gage Trendel Email: gage.trendel@gmail.com

No. of Pages (including cover pg.): 26

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Date: 2/7/22 Signed: \_\_\_\_\_

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A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

- None

Client	Sample Date	Reported Turn Around Time	Analysis	Matrix
Client Sample Identification				
Revised: 2/2/22				
Redford	2/2/22	Urgent	1.4-Dioxane	Water
Redford	2/2/22	Urgent	1.4-Dioxane	Water
Combustion/Fill-site	2/2/22	Urgent	1.4-Dioxane	Water
HRF-604	2/2/22	Urgent	1.4-Dioxane	Water
HRF-604	2/2/22	Urgent	1.4-Dioxane	Water
HRF-1	2/2/22	Urgent	1.4-Dioxane	Water
Redford	2/2/22	Urgent	1.4-Dioxane	Water
Redford	2/2/22	Urgent	1.4-Dioxane	Water
HRF-15	2/2/22	Urgent	1.4-Dioxane	Water
HRF-604	2/2/22	Urgent	1.4-Dioxane	Water
HRF-604	2/2/22	Urgent	1.4-Dioxane	Water
HRF-15	2/2/22	Urgent	1.4-Dioxane	Water
HRF-604	2/2/22	Urgent	1.4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses:

<u>Analysis</u>	<u>Number of Samples</u>
* 1,4-Dioxane (USEPA 624) - Urgent TAT	* 14 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

0081-4832(199405)62:0522:4-0

*Graduates in Chemistry & Environmental Science*  
200 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734/765-0905 Fax 734/765-3721











# ANN ARBOR TECHNICAL SERVICES, INC.

## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: US EPA 1631  
QA/QC Batch Number: 000902004231  
SOG: 0004231  
Project Number: 0001-002.22  
Report Date: 2/10/22

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	GIS	Sample Concentration	Spike Added	Measured Concentration	Units	Recovery Factor	LOD	UCL	Comments
00021-1-MSD	02/04/2022	15:10:57	1,4-Dioxane	124-01-1	1.32	2.82	1.5	µg/L	112	0.1	0.1	

**Controls:**  
All control samples are 100% recovery.  
All control samples are 100% recovery.  
All control samples are 100% recovery.



# ANN ARBOR TECHNICAL SERVICES, INC.

## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: US EPA 1631  
QA/QC Batch Number: 000902004231  
SOG: 0004231  
Project Number: 0001-002.22  
Report Date: 2/10/22

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	GIS	Sample Concentration	Spike Added	Measured Concentration	Units	Recovery Factor	LOD	UCL	Comments
00021-1-MS	02/04/2022	15:10:57	1,4-Dioxane	124-01-1	1.32	2.82	1.5	µg/L	112	0.1	0.1	

**Controls:**  
All control samples are 100% recovery.  
All control samples are 100% recovery.  
All control samples are 100% recovery.

Ann Arbor Technical Services, Inc.  
2000 South Main Street  
Ann Arbor, Michigan 48103

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### 1,4-Dioxane by GC/MS

Parameter	Method	Result	MDL	REL	Out
1,4-Dioxane	124-01-1	1.32	0.07	112	

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes



### 1,4-Dioxane by GC/MS

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes



### 1,4-Dioxane by GC/MS

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes



### 1,4-Dioxane by GC/MS

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes



### 1,4-Dioxane by GC/MS

ATB Project Number	0001-002.22	Project Name	1,4-Dioxane
ATB SOD Number	00000000	Preparation Date	02/04/2022
Client Sample ID	00000000	Analysis Date	02/04/2022
Laboratory Sample ID	00000000	Instrument	7890A
Matrix	Water	Background (µg/L)	0.00
Sample Size	1000	Injection Volume (µL)	1
Analysis Method (EPA#)	US EPA 8210	Dilution Factor	1
Preparation Method (EPA#)	US EPA 8210	Blank	Yes
QC Batch Number	00000000	Blank	Yes

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At each time interval (0, 10, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400, 420, 440, 460, 480, 500, 520, 540, 560, 580, 600, 620, 640, 660, 680, 700, 720, 740, 760, 780, 800, 820, 840, 860, 880, 900, 920, 940, 960, 980, 1000, 1020, 1040, 1060, 1080, 1100, 1120, 1140, 1160, 1180, 1200, 1220, 1240, 1260, 1280, 1300, 1320, 1340, 1360, 1380, 1400, 1420, 1440, 1460, 1480, 1500, 1520, 1540, 1560, 1580, 1600, 1620, 1640, 1660, 1680, 1700, 1720, 1740, 1760, 1780, 1800, 1820, 1840, 1860, 1880, 1900, 1920, 1940, 1960, 1980, 2000, 2020, 2040, 2060, 2080, 2100, 2120, 2140, 2160, 2180, 2200, 2220, 2240, 2260, 2280, 2300, 2320, 2340, 2360, 2380, 2400, 2420, 2440, 2460, 2480, 2500, 2520, 2540, 2560, 2580, 2600, 2620, 2640, 2660, 2680, 2700, 2720, 2740, 2760, 2780, 2800, 2820, 2840, 2860, 2880, 2900, 2920, 2940, 2960, 2980, 3000, 3020, 3040, 3060, 3080, 3100, 3120, 3140, 3160, 3180, 3200, 3220, 3240, 3260, 3280, 3300, 3320, 3340, 3360, 3380, 3400, 3420, 3440, 3460, 3480, 3500, 3520, 3540, 3560, 3580, 3600, 3620, 3640, 3660, 3680, 3700, 3720, 3740, 3760, 3780, 3800, 3820, 3840, 3860, 3880, 3900, 3920, 3940, 3960, 3980, 4000, 4020, 4040, 4060, 4080, 4100, 4120, 4140, 4160, 4180, 4200, 4220, 4240, 4260, 4280, 4300, 4320, 4340, 4360, 4380, 4400, 4420, 4440, 4460, 4480, 4500, 4520, 4540, 4560, 4580, 4600, 4620, 4640, 4660, 4680, 4700, 4720, 4740, 4760, 4780, 4800, 4820, 4840, 4860, 4880, 4900, 4920, 4940, 4960, 4980, 5000, 5020, 5040, 5060, 5080, 5100, 5120, 5140, 5160, 5180, 5200, 5220, 5240, 5260, 5280, 5300, 5320, 5340, 5360, 5380, 5400, 5420, 5440, 5460, 5480, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5700, 5720, 5740, 5760, 5780, 5800, 5820, 5840, 5860, 5880, 5900, 5920, 5940, 5960, 5980, 6000, 6020, 6040, 6060, 6080, 6100, 6120, 6140, 6160, 6180, 6200, 6220, 6240, 6260, 6280, 6300, 6320, 6340, 6360, 6380, 6400, 6420, 6440, 6460, 6480, 6500, 6520, 6540, 6560, 6580, 6600, 6620, 6640, 6660, 6680, 6700, 6720, 6740, 6760, 6780, 6800, 6820, 6840, 6860, 6880, 6900, 6920, 6940, 6960, 6980, 7000, 7020, 7040, 7060, 7080, 7100, 7120, 7140, 7160, 7180, 7200, 7220, 7240, 7260, 7280, 7300, 7320, 7340, 7360, 7380, 7400, 7420, 7440, 7460, 7480, 7500, 7520, 7540, 7560, 7580, 7600, 7620, 7640, 7660, 7680, 7700, 7720, 7740, 7760, 7780, 7800, 7820, 7840, 7860, 7880, 7900, 7920, 7940, 7960, 7980, 8000, 8020, 8040, 8060, 8080, 8100, 8120, 8140, 8160, 8180, 8200, 8220, 8240, 8260, 8280, 8300, 8320, 8340, 8360, 8380, 8400, 8420, 8440, 8460, 8480, 8500, 8520, 8540, 8560, 8580, 8600, 8620, 8640, 8660, 8680, 8700, 8720, 8740, 8760, 8780, 8800, 8820, 8840, 8860, 8880, 8900, 8920, 8940, 8960, 8980, 9000, 9020, 9040, 9060, 9080, 9100, 9120, 9140, 9160, 9180, 9200, 9220, 9240, 9260, 9280, 9300, 9320, 9340, 9360, 9380, 9400, 9420, 9440, 9460, 9480, 9500, 9520, 9540, 9560, 9580, 9600, 9620, 9640, 9660, 9680, 9700, 9720, 9740, 9760, 9780, 9800, 9820, 9840, 9860, 9880, 9900, 9920, 9940, 9960, 9980, 10000, 10020, 10040, 10060, 10080, 10100, 10120, 10140, 10160, 10180, 10200, 10220, 10240, 10260, 10280, 10300, 10320, 10340, 10360, 10380, 10400, 10420, 10440, 10460, 10480, 10500, 10520, 10540, 10560, 10580, 10600, 10620, 10640, 10660, 10680, 10700, 10720, 10740, 10760, 10780, 10800, 10820, 10840, 10860, 10880, 10900, 10920, 10940, 10960, 10980, 11000, 11020, 11040, 11060, 11080, 11100, 11120, 11140, 11160, 11180, 11200, 11220, 11240, 11260, 11280, 11300, 11320, 11340, 11360, 11380, 11400, 11420, 11440, 11460, 11480, 11500, 11520, 11540, 11560, 11580, 11600, 11620, 11640, 11660, 11680, 11700, 11720, 11740, 11760, 11780, 11800, 11820, 11840, 11860, 11880, 11900, 11920, 11940, 11960, 11980, 12000, 12020, 12040, 12060, 12080, 12100, 12120, 12140, 12160, 12180, 12200, 12220, 12240, 12260, 12280, 12300, 12320, 12340, 12360, 12380, 12400, 12420, 12440, 12460, 12480, 12500, 12520, 12540, 12560, 12580, 12600, 12620, 12640, 12660, 12680, 12700, 12720, 12740, 12760, 12780, 12800, 12820, 12840, 12860, 12880, 12900, 12920, 12940, 12960, 12980, 13000, 13020, 13040, 13060, 13080, 13100, 13120, 13140, 13160, 13180, 13200, 13220, 13240,

Office: 734-695-4105  
Fax: 734-695-3731



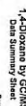
of serum albumin (3.5 g/L), urea nitrogen (10.0 mg/dL), creatinine (1.0 mg/dL), and calcium (9.0 mg/dL) were within normal limits. The patient was discharged on 10 mg of prednisone daily and 100 mg of azathioprine daily. She was followed up in the outpatient clinic and remained in remission for 1 year.

Office 734-595-0915  
Fax 734-695-1721

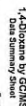


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Product quality supported by (HPLC) based upon bioprocess (fermentation) studies.  
All solutions described in this study are based upon bioprocess studies.

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Considerable evidence points to smoking, alcohol intake, smoking cessation, and diet as factors that may influence the risk of developing colorectal cancer. However, the results of the present study suggest that the influence of these factors may be modified by the genetic background of the individual. In addition, the results of the present study suggest that the influence of these factors may be modified by the genetic background of the individual.

Order: 734-000-0005  
Fax: 734-000-3701

Experiments performed prior to recording.  
Project: Speech training and pitch. (based upon vocal calibration literature)  
M: Behavioural training, memory and sound upon speech training.  
Sample evaluated at various p/s.

Circle 13 on Reader Service Card

# Data Transmittal Cover Page

Project Name: Pall Corporation  
 ATS Project Number: G001-002  
 ATS Report Number(s): Inorg\_SRF\_0207221  
 Client PO Number: 4505089688  
 Project Description: This data report contains the results of 8 water samples, received by ATS on February 7, 2022 to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure (SOP) maintained by the ATS Laboratory, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

Recipient: Mr. George Trenchard Email: goge\_trenchard@pall.com  
 FAX Number:

No. of Pages (including cover pg): 19

From: Sarah Shubert Email: Sarah.Shubert@AnnArborTechnicalServices.com  
 Sarah Shubert is a Lab Manager FAX Number: 734-995-3723

Additional Message: Copy report to: Patterson, Keith (kjpatterson@pall.com), Brode, Jim (jim\_brode@pall.com),  
 Keith Shubert (kshubert@pall.com), neococh@pall.com, Patricia, Sue (sue\_patterson@pall.com),  
 Amanda Isabella (amanda\_isabella@pall.com)

Date: 2/14/22 Signed: [Signature]

IF YOU DO NOT RECEIVE ALL PAGES OF THIS TRANSMITTAL, PLEASE CALL 734-995-0000.

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## ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.22  
 ATS SDG: 0207221

Prepared By:  
 Ann Arbor Technical Services, Inc.  
 290 South Wagner Road  
 Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002  
 Report Date: 2/14/22  
 SRF / SDG Number(s): 0207221  
 Client PO Number: 4505089688

### Case Narrative Summary

This case narrative applies to the following 8 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 2/7/22, and associated matrix-specific QA/QC.

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Reagent Blank	2/9/22	10 days	1,4-Dioxane	Water
Field Blank	2/9/22	10 days	1,4-Dioxane	Water
Compliance Effluent	2/9/22	10 days	1,4-Dioxane	Water
FFRQC-1A	2/9/22	10 days	1,4-Dioxane	Water
FFRQC-3A	2/9/22	10 days	1,4-Dioxane	Water
10A	2/9/22	10 days	1,4-Dioxane	Water
Field Blank	2/9/22	10 days	1,4-Dioxane	Water
Field Blank	2/9/22	10 days	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

Analysis: 1,4-Dioxane (USEPA 1624) - 10 day TAT  
 Number of Samples: 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample conditions and conditions, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

None

G001-002.22\CV\_0207221.doc

Consultants in Chemistry & Environmental Lab  
 290 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734.995.0000 Fax 734.995.0001

### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedure (SOP) maintained by the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the Laboratory's Quality Assurance/Quality Control Manual.

A single QA/QC batch is defined as no more than 20 samples including method blanks (MR, LMR), fortified blanks (BS, LFR, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK MSD, DUP, LR).

### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DWP, EPA R5 ED0) are available upon request. There were no laboratory data memory alerts generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Purge and Trap Gas Chromatography - Mass Spectrometry). An initial calibration with at least five levels was used to quantify 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

### Accumulated Matrix

None

### Analytical QA/QC Summary

#### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (ICV) standard at the frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None

#### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None

### QA/QC Batch Summary

#### Internal Standards

Internal standards added and retention times met the acceptance criteria with the following exceptions:

None

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### Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

### Sample Dilutions

Samples containing compounds at concentrations above the initial calibration curves were diluted and reanalyzed for these compounds. The following samples were diluted for 1,4-Dioxane:

Field Blank 2452

[Signature]

February 14, 2022

Mark T. DeLong (Quality Assurance Coordinator)

[Signature]

February 14, 2022

Philip B. Simon (Laboratory Director)

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CHAIN OF CUSTODY RECORD

Sample ID	Sample Description	Sample Date	Sample Time	Sample Location	Sample Volume	Sample Matrix	Sample Analysis	Sample Results	Sample Comments
1	Reagent Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
2	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
3	Compliance Effluent	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
4	FFRQC-1A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
5	FFRQC-3A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
6	10A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
7	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
8	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	

\* - Requested Turn-Around Time Priority Number Key: 4 = Urgent 2 = Batch 3 = Standard

## ANN ARBOR TECHNICAL SERVICES, INC.

### QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method	USEPA 1624	SDG	Lab Sample ID	Sample Date	Sample Time	Sample Location	Sample Volume	Sample Matrix	Sample Analysis	Sample Results	Sample Comments
1	1,4-Dioxane	0.00 mg/L	Reagent Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
2	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
3	1,4-Dioxane	0.00 mg/L	Compliance Effluent	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
4	1,4-Dioxane	0.00 mg/L	FFRQC-1A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
5	1,4-Dioxane	0.00 mg/L	FFRQC-3A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
6	1,4-Dioxane	0.00 mg/L	10A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
7	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
8	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	



## ANN ARBOR TECHNICAL SERVICES, INC.

### QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method	USEPA 1624	SDG	Lab Sample ID	Sample Date	Sample Time	Sample Location	Sample Volume	Sample Matrix	Sample Analysis	Sample Results	Sample Comments
1	1,4-Dioxane	0.00 mg/L	Reagent Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
2	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
3	1,4-Dioxane	0.00 mg/L	Compliance Effluent	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
4	1,4-Dioxane	0.00 mg/L	FFRQC-1A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
5	1,4-Dioxane	0.00 mg/L	FFRQC-3A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
6	1,4-Dioxane	0.00 mg/L	10A	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
7	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	
8	1,4-Dioxane	0.00 mg/L	Field Blank	2/9/22	10:00	Ann Arbor, MI	100 mL	Water	1,4-Dioxane	0.00 mg/L	

Comments: All samples were analyzed within 45 days of receipt. All samples met the acceptance criteria. No exceptions were noted.

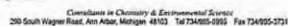




















QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method:	USEPA 1624
QA/QC Batch Number:	QCORG211221
SOG:	6211221
Project Number:	G001-002.22
Record Date:	7/14/2019

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Excs	RPD	Control Limit	Comments
02110211-1 MS	05/11/2022	12:15:44	1,4-Dioxane	123-91-1	0.790		mg/L	Wet			
02110211-2 MS	05/11/2022	12:16:55	1,4-Dioxane	123-91-1	0.773	0.781	mg/L	Wet	2.20	20	

### Comments

**Comments:**  
All methods showed LO EPA methods gave similar results.  
Calculations performed per LO finding.  
Protein specific leucine and (PCA) based per leucine oxidation constant  
M - indicates leucine specific and based per sample dilution.

Ann Arbor Technical Service  
280 South Wacker Road  
Ann Arbor, Michigan 48103

Office: 724-636-0790  
Fax: 724-636-3173

Ann Arbor Technical Services  
210 South Wagner Road  
Ann Arbor, Michigan 48102

Office: 724-483-0316  
Fax: 724-483-3172

Ann Arbor Technical Service  
200 South Weyner Road  
Ann Arbor, Michigan 48106

Circle 124 on Reader Service

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY BLANK SUMMARY

Method:	USEPA 824
QA/QC Batch Number:	QC08/021122
SDG	0211221
Project Number:	0001-002.22
Report Date:	2/14/2022

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lot Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Scale	Method Detection Limit	Reporting Detection Limit	Comments
UGB-1 2/15/22	22/11/2022	07:58:57	1,4-Cocaine	120-81-1		mg/L	Wet	0.001		

Continued

All methods reviewed US EPA records unless otherwise noted.  
Calculations performed per the following:  
Percent biofilm forming (b.f.) =  $\frac{\text{b.f.} - \text{b.c.}}{\text{b.c.} - \text{a.c.}} \times 100$   
b.f. = biofilm forming (b.f.)  
b.c. = biofilm control (b.c.)  
a.c. = abiotic control (a.c.)

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY ACCURACY SUMMARY

MailPost:	USEPA 1E24
QA/QC Batch Number:	OC04G021122
SOG	G211221
Project Number:	G001-002.22
Report Date:	3/14/2022

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Last Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Amount	Measured Concentration	Units	Blank	Percent Recovery	LCL	UCL	Comments
4000-000-0000	4/10/2018	10:00:00	1,1,1-Trichloroethane	7063	0.0000	0.0000	0.0000	ug/L	0.00	100	NA	NA	

## Carries

**Comments:**  
All patients whose US EPA methods were otherwise noted.  
Calculations performed per E-1000.  
Percent sample reporting (SRP) based upon lowest detection limit.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY ACCURACY SUMMARY

Method:	USEPA 1631
DAQC Batch Number:	QC0002112
EDG	0211221
Project Number:	0001-002.32
Sample Date:	2/14/2003

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Base	Percent Recovery	LCL	UCL	Comments
---------------	---------------	---------------	---------------	-----	----------------------	-------------	------------------------	-------	------	------------------	-----	-----	----------

**Cannabis**

Protein synthesis (measured by  $^{35}\text{S}$  incorporation) was determined in the presence of 100  $\mu\text{M}$  cycloheximide.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY ACCURACY SUMMARY

Method:	USEPA 1631
QA/QC Batch Number:	GCOR02112
SOG	E211221
Project Number:	G001-0222
Report Date:	2/14/2019

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Base Units	Patient Recovery	LCL	UCL	Comments
										\$7.6	A0	120	

**Comment**

† All metrics reference US EPA national urban areas trend.  
‡ Calculations performed prior to rounding.  
§ Properly specifies reporting limit (NCL) based upon lowest individual sample.  
|| 10 - Indicates air quality monitoring limit based upon sample cluster.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021	Preparation Date	02/06/2022
Client Sample ID	Red Pond	Analysis Date	02/06/2022 10:37:55
Laboratory Sample ID	020021-2	Instrument	2100V
Matrix	Water	Subsample (mL)	3.000
Sample Date	02/06/2022 7:35	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.37	0.01		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021	Preparation Date	02/06/2022
Client Sample ID	MM-108	Analysis Date	02/06/2022 10:44:39
Laboratory Sample ID	020021-3	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 10:04	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.04	0.01		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021	Preparation Date	02/06/2022
Client Sample ID	MM-108	Analysis Date	02/06/2022 10:26:31
Laboratory Sample ID	020021-10	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 11:13	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.26	0.01		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021	Preparation Date	02/06/2022
Client Sample ID	MM-108	Analysis Date	02/06/2022 17:12:12
Laboratory Sample ID	020021-11	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 19:08	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.17	0.01		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021	Preparation Date	02/06/2022
Client Sample ID	MM-108	Analysis Date	02/06/2022 17:08:51
Laboratory Sample ID	020021-12	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 14:35	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.38	0.01		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021A	Preparation Date	02/06/2022
Client Sample ID	Outlet	Analysis Date	02/06/2022 17:08:51
Laboratory Sample ID	020021A	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 14:35	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.000	0.001		

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	020021A	Preparation Date	02/06/2022
Client Sample ID	Red Pond	Analysis Date	02/06/2022 17:08:51
Laboratory Sample ID	020021-2	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 7:35	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.37	0.04		M

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATL Project Number	0001-002.22	Percent Moisture	100.0
ATL BOD Number	021022	Preparation Date	02/06/2022
Client Sample ID	Outlet	Analysis Date	02/06/2022 17:08:51
Laboratory Sample ID	021022-1	Instrument	2100V
Matrix	Water	Subsample (mL)	0.000
Sample Date	02/06/2022 14:35	Final Volume (mL)	0.000
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	15
Preparation Method (USEPA)	USEPA 1624	Units	mg/L
QC Batch Number	QC000000021	Units	mg/L

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.000	0.001		

## Comments

Calibration reference (10.0%) method volume reference noted.  
Calibration reference (10.0%) method volume reference noted.  
Prevent sample reporting from ATSL based upon known calibration standard.  
M Indicates method reporting that based upon sample dilution.





# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	40
Sample Date	02/16/2022 7:00	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 18:04:13
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.36	0.04		M

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	1
Sample Date	02/16/2022 7:00	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 18:46:00
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.305	0.001		

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	40
Sample Date	02/16/2022 7:00	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 11:31:52
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.36	0.04		M

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	1
Sample Date	02/16/2022 7:00	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 15:11:11
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	1
Sample Date	02/16/2022 11:38	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 15:04:35
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	1
Sample Date	02/16/2022 11:38	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 16:36:43
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.343	0.001		

Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATB Project Number	0001-002.22	Percent Moisture	100.0
ATB SDB Number	Q21021	Instrument	7100V
Client Sample ID	MR-430	Subsample (mL)	0.000
Laboratory Sample ID	Q21021-2	Final Volume (mL)	0.000
Matrix	Water	Dilution Factor	10
Sample Date	02/16/2022 11:53	Units	mg/L
Analytical Method (USEPA)	USEPA 1624	Preparation Date	02/16/2022
Preparation Method (USEPA)	USEPA 1624	Analysis Date	02/16/2022 17:22:38
QC Batch Number	QCCRM0211221		

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.28	0.01		M

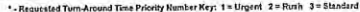
Comments  
Customer comments (if any) regarding issues or concerns noted.  
Comments performed prior to testing.  
Please specify reporting limit (RL) based upon tested calibration standard.  
M - Includes manual reporting limit based upon sample dilution.  
Sample analyzed at 10000 psi.















Version: US EPA 1624  
QA/QC Batch Number: G0010217021  
SDG: 0218221  
Report Number: 00110222  
Project Date: 2/1/2022

Laboratory Reagent Blank (LBR) / Method Blank (MB)

Lab Name	Lab Code	Lab Date	Lab Time	Lab User	Lab Result	Lab Units	Lab Method	Lab Instrument	Lab Comments
Lab Name: C	Lab Code: 00110222	Lab Date: 2/1/2022	Lab Time: 14:28	Lab User: 14:28	Lab Result: 0.00	Lab Units: mg/L	Lab Method: 1631	Lab Instrument: 837	Lab Comments: 0.00

Signature: [Signature]  
Date: 2/1/2022  
Time: 14:28

Version: US EPA 1624  
QA/QC Batch Number: G0010217021  
SDG: 0218221  
Report Number: 00110222  
Project Date: 2/1/2022

Laboratory Filled Blank (LFB) / Laboratory Control Sample (LCS)

Lab Name	Lab Code	Lab Date	Lab Time	Lab User	Lab Result	Lab Units	Lab Method	Lab Instrument	Lab Comments
Lab Name: C	Lab Code: 00110222	Lab Date: 2/1/2022	Lab Time: 14:28	Lab User: 14:28	Lab Result: 0.00	Lab Units: mg/L	Lab Method: 1631	Lab Instrument: 837	Lab Comments: 0.00

Signature: [Signature]  
Date: 2/1/2022  
Time: 14:28

Version: US EPA 1624  
QA/QC Batch Number: G0010217021  
SDG: 0218221  
Report Number: 00110222  
Project Date: 2/1/2022

Matrix Spike (MS)

Lab Name	Lab Code	Lab Date	Lab Time	Lab User	Lab Result	Lab Units	Lab Method	Lab Instrument	Lab Comments
Lab Name: C	Lab Code: 00110222	Lab Date: 2/1/2022	Lab Time: 14:28	Lab User: 14:28	Lab Result: 0.00	Lab Units: mg/L	Lab Method: 1631	Lab Instrument: 837	Lab Comments: 0.00

Signature: [Signature]  
Date: 2/1/2022  
Time: 14:28

Version: US EPA 1624  
QA/QC Batch Number: G0010217021  
SDG: 0218221  
Report Number: 00110222  
Project Date: 2/1/2022

Matrix Spike Duplicate (MSD)

Lab Name	Lab Code	Lab Date	Lab Time	Lab User	Lab Result	Lab Units	Lab Method	Lab Instrument	Lab Comments
Lab Name: C	Lab Code: 00110222	Lab Date: 2/1/2022	Lab Time: 14:28	Lab User: 14:28	Lab Result: 0.00	Lab Units: mg/L	Lab Method: 1631	Lab Instrument: 837	Lab Comments: 0.00

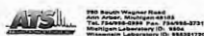
Signature: [Signature]  
Date: 2/1/2022  
Time: 14:28

Version: US EPA 1624  
QA/QC Batch Number: G0010217021  
SDG: 0218221  
Report Number: 00110222  
Project Date: 2/1/2022

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Name	Lab Code	Lab Date	Lab Time	Lab User	Lab Result	Lab Units	Lab Method	Lab Instrument	Lab Comments
Lab Name: C	Lab Code: 00110222	Lab Date: 2/1/2022	Lab Time: 14:28	Lab User: 14:28	Lab Result: 0.00	Lab Units: mg/L	Lab Method: 1631	Lab Instrument: 837	Lab Comments: 0.00

Signature: [Signature]  
Date: 2/1/2022  
Time: 14:28



### Data Transmittal Cover Page

Project Name: Pail Corporation  
ATS Project Number: G001-002  
ATS Report Number(s): Inorg\_SRF\_0218221  
Client PO Number: 4505089658

Project Description: This data report contains the results of 11 water samples, received by ATS on February 16, 2022 to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with standard procedures described in a written Standard Operating Procedure specific to the ATS Laboratory, as required by USEPA. Laboratory data sheets, SDG, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and handling requirements have been met.

Recipient: Mr. Oleg Terebin Email: oleg\_terebin@pail.com  
FAX Number:

No. of Pages (including cover pg.): 23

From: Sarah Shubert Email: Sarah.Shubert@AnnArborTechnicalServices.com  
FAX Number: 734-995-3771

Additional Message: Copy report to: Perlemon, Keith (keith.perlemon@pail.com), Brind, Jim (jim.brind@pail.com), Katie Dineen (katie.dineen@pail.com), neel@pail.com, Pail, Sue (sue.pail@pail.com), Amanda Isabella (amanda.isabella@pail.com)

Date: 2/1/2022 Signed: [Signature]

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### ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.22  
ATS SDG: 0218221

Prepared By:  
Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, MI 48103



### LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002  
Report Date: 2/21/22  
SRF / SDG Number(s): 0218221  
Client PO Number: 4505089658

#### Case Narrative Summary

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 2/16/22, and associated matrix-specific QA/QC:

Client Sample Identification	Sample Date	Prepared Time	Analysis	Matrix
Reagent	2/1/2022			
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water
Blank	2/1/2022	14:28	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses:

Analysis	Number of Samples
1,4-Dioxane (USEPA 1624) - Urgent TAT	7 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
1,4-Dioxane (USEPA 1624) - Standard TAT	4 Samples

G001-002-2308a\_1\0218221.doc

Consultants in Chemistry & Environmental Science  
290 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734-995-0055 Fax 734-995-3771





Method: USEPA 1624  
DUOQ Batch Number: GQ090210221  
Lab File #: 123-91-1  
Project Name: 123-91-1

Lab Sample ID: 123-91-1  
Lab Sample Name: 123-91-1

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Lab Sample Name: 123-91-1



1,4-Dioxane by GC/MS  
Data Summary Sheet

ATL Project Number	G091-002-22	Percent Moisture	100.0
ATL BOD Number	G210221	Instrument	7100V
Client Sample ID	Outfall	Subsample (mL)	5.000
Laboratory Sample ID	G210221-1	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	03/15/2022	Beak	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	03/15/2022
QC Batch Number	GQ090210221	Analyte Date	03/15/2022 11:02:00

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.30	0.04		M

Comments:  
All methods reference 10/1/14 methods unless otherwise noted.  
Qualification performed per 10/1/14.  
Percent moisture reported (mL/gal) based upon known volume added.  
All methods reference 10/1/14 based upon sample dilution.



1,4-Dioxane by GC/MS  
Data Summary Sheet

ATL Project Number	G091-002-22	Percent Moisture	100.0
ATL BOD Number	G210221	Instrument	7100V
Client Sample ID	Outfall	Subsample (mL)	5.000
Laboratory Sample ID	G210221-1	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	03/15/2022	Beak	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	03/15/2022
QC Batch Number	GQ090210221	Analyte Date	03/15/2022 14:04:22

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.010	0.001		

Comments:  
All methods reference 10/1/14 methods unless otherwise noted.  
Qualification performed per 10/1/14.  
Percent moisture reported (mL/gal) based upon known volume added.  
All methods reference 10/1/14 based upon sample dilution.



1,4-Dioxane by GC/MS  
Data Summary Sheet

ATL Project Number	G091-002-22	Percent Moisture	100.0
ATL BOD Number	G210221	Instrument	7100V
Client Sample ID	Outfall	Subsample (mL)	5.000
Laboratory Sample ID	G210221-1	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	03/15/2022	Beak	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	03/15/2022
QC Batch Number	GQ090210221	Analyte Date	03/15/2022 14:46:00

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.002	0.001		

Comments:  
All methods reference 10/1/14 methods unless otherwise noted.  
Qualification performed per 10/1/14.  
Percent moisture reported (mL/gal) based upon known volume added.  
All methods reference 10/1/14 based upon sample dilution.



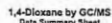
1,4-Dioxane by GC/MS  
Data Summary Sheet

ATL Project Number	G091-002-22	Percent Moisture	100.0
ATL BOD Number	G210221	Instrument	7100V
Client Sample ID	Outfall	Subsample (mL)	5.000
Laboratory Sample ID	G210221-1	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	03/15/2022	Beak	Wet
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	03/15/2022
QC Batch Number	GQ090210221	Analyte Date	03/15/2022 17:43:10

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.002	0.001		

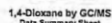
Comments:  
All methods reference 10/1/14 methods unless otherwise noted.  
Qualification performed per 10/1/14.  
Percent moisture reported (mL/gal) based upon known volume added.  
All methods reference 10/1/14 based upon sample dilution.



1,4-Dioxane by GC/MS  
Data Summary Sheet

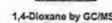
Parameter	CAS	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.006	0.001		

**Comments**  
All methods reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project sample reporting limit (MRL) based upon lowest detectable standard.  
M = Inductor allowed reporting limit based upon sample dilution.  
Details provided in methods file.

1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	101-07-1	0.12	0.03		10

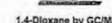
**Comments**  
All pathway reference (R) LPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Percent specific missing (M) (M%) based upon lowest calculation identified.  
M = indicates missing regarding brief based upon sample (N).



## 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MDL	PQL	Qual
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**Comments**  
 All authors contributed to the study methods unless otherwise noted.  
 Calculations performed prior to rounding.  
 Preprint JMIR Publications 2023 | <https://doi.org/10.2196/preprint.56333>  
 JMIR Publications 2023 | <https://doi.org/10.2196/preprint.56333>



### 1,4-Dioxane by GC/MS

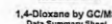
Parameter	CASE	Result	MDL	POL	Cost
-----------	------	--------	-----	-----	------

**Comments:**  
No verifiable references (1) 5.0% Mammals within 500m of road.  
Cuckoo-shrike performed prior to trapping.  
Please specify reporting time (UTC) (checked upon arrival collection start time)

Office: 734-665-0702  
Fax: 734-665-1711

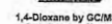
Office: 734-695-0310

Office: 734-935-0300

1,4-Dioxane by GC/M  
Data Summary Sheet

Parameter	CASB	Result	MDL	POL	Qual
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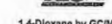
**Connects**  
All methods reference `US EPA methods unless otherwise noted.`  
Calculations performed prior to housing.  
Protein specific reporting time (US EPA) based upon lowest detection during  
10 - 15 minutes allowed reporting time based upon sample dilution.



## 1,4-Dioxane by GC/M

Parameter	CAS#	Result	MQL	PQL	Qual
-----------	------	--------	-----	-----	------

**Comments**  
All methods reference (in EPA methods column, otherwise listed).  
Calculations performed prior to rounding.  
Percent specific reporting limit (SRL) based upon lowest calibration standard.  
All data were within 5% of the true value based upon calibration.



#### 1,4-Dioxane by GC/MS

Parameter	CASE	Result	95% CI	P
-----------	------	--------	--------	---

**Comments**  
All methods adhere to the STROBE reporting guideline.  
Calculations performed prior to blinding.  
Research ethics board approval obtained.

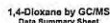


4.4.21. *Staphylococcus aureus* (ATCC 29222)

**Comments** \_\_\_\_\_  
No authors received 1/3 LTR methods unless otherwise noted.  
Can authors participate prior to meeting.

Office: 734-958-0000

Order: T54-005-00

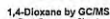
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CASE	Result	MDL	PQL	Goal
1.4-Dioxane	123-01-1	0.025	0.001		

**Comments**  
All methods reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project specific reporting limit (MCL) based upon lowest calibration standard.  
M = indicates elevated reporting limit based upon sample dilution,  
sample only and at method pin.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-935-0050  
Fax: 734-935-3731

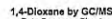


### 1,4-Dioxane by GC/MS

Parameter	CASE	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.39	0.01		M

**Comments**  
All reactions performed at 25 °C, unless otherwise noted.  
Catalysts performed prior to monomer.  
Percent yields reported are based on GC (GC) based upon known calibration standards.  
M = 1,4-bis(phenylthio)butane-1,4-diol; M = 1,4-bis(phenylthio)butane-1,4-diol.

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Office: 734-995-0060  
Fax: 734-485-3731

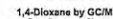


## 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.055	0.001		

**Comments**  
All methods reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project species reporting limit (MRL) based upon lowest calibration standard.  
M: indicates elevated (reporting limit based) upon sample (N/A).

Ann Arbor Technical Services, Inc.  
205 South Wagner Road  
Office: 734-955-0895  
Fax: 734-955-3731



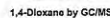
## 1,4-Dioxane by GC/M

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-61-1	0.14	0.035		M

**Comments**  
All available references (3/15/19) indicate serious information failed.  
Cub's delivery performance prior to disaster.  
Project specific reporting time (3/15/19) based upon lowest quality of work.  
M. 1. Includes elevated variance (10) based upon sample data.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-935-0029  
Fax: 734-935-3731



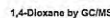
### 1,4-Dioxane by GC/MS

Parameter	CAS	Result	MDL	POL	Qual
1,4-Dioxane	123-81-1	0.18	0.005		M

**Comments:**  
All facilities reference US EPA methods unless otherwise noted.  
Calculations performed prior to rounding.  
Project specific reporting limit (MRL) based upon lowest achievable standard.  
M = values detected; ND = values not based upon current detection.

Ann Arbor Technical Services, Inc.  
280 South Wagner Road  
Ann Arbor, Michigan 48102

Office: 734-665-0550  
Fax: 734-665-3731



## 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MDL	PDL	Qual
1,4-Dioxane	123-01-1	0.02	0.01		M

**Comments:**  
All analytical reference (US EPA, methods unless otherwise noted).  
Calculations performed prior to rounding.  
Present specific reporting level (MCL) based upon lowest calibration standard.  
MCL indicates absolute specification based upon current detection.

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-955-0995  
Fax: 734-955-3731

# Data Transmittal Cover Page

Project Name: Pail Corporation  
 ATS Project Number: G001-002  
 ATS Report Number(s): Inorg\_SRF\_0221221  
 Client PO Number: 450589688  
 Project Description: This data report contains the results of 20 water samples, received by ATS on February 21, 2022 to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratory, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for review and audit at the laboratory upon request. Unless specifically noted on this data report, all applicable sample preservation and holding time requirements have been met.

Recipient: Mr. Gage Trendel Email: [gage\\_trendel@ats.com](mailto:gage_trendel@ats.com)  
 FAX Number:

No. of Pages (including cover page): 34

From: Sarah Stubbfield Email: [sarah.stubbfield@annarbortechnicalservices.com](mailto:sarah.stubbfield@annarbortechnicalservices.com)  
 Sarah Stubbfield, Lab Manager FAX Number: 734-995-3721

Additional Message: Copy report to: Polhemus, Kelly (kelly.polhemus@ats.com), Doyle, Jim (jim.doyle@ats.com), Kaku, Shihong (shihong.kaku@ats.com), neoc@tsi-us.com, Pature, Sue (sue.pature@ats.com), Amanda Nishida (amanda.nishida@ats.com)

Date: 3/25/22 Sign:

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\\G001-002\270000\_Transmittal\_Cover\_Page\_1-1.doc

## ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.22

ATS SDG: 0221221

Prepared By:  
 Ann Arbor Technical Services, Inc.  
 200 South Wagner Road  
 Ann Arbor, MI 48103

## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002  
 Report Date: 2/28/22  
 SRP / SDG Number(s): 0221221  
 Client PO Number: 450589688

### Case Narrative Summary

This case narrative applies to the following 20 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 2/21/22, and associated matrix-specific QA/QC.

Client Sample Identification	Sample Date	Sample Turn Around Time	Analysis	Matrix
Method 801	2/21/22	Urgent	1,4-Dioxane	Water
Real Time	2/21/22	Urgent	1,4-Dioxane	Water
Concentration (100ml)	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water
1000-10	2/21/22	Urgent	1,4-Dioxane	Water

G001-002.21\0N\_0221221.doc

Consultants in Chemistry & Environmental Science  
 200 South Wagner Road, Ann Arbor, Michigan 48103 Tel 734.995.0000 Fax 734.995.3721

Upon receipt samples were scheduled for the following analysis:

Analysis: 1,4-Dioxane (USEPA 1624) - Urgent TAT  
 1,4-Dioxane (USEPA 1624) - Standard TAT  
 Number of Samples: 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate  
 12 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pail Corporation staff. Samples were received with proper chain of custody records included. Sample condition and retention, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedure (SOP) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance/Quality Control Manual.

A single QA/QC batch is defined as no more than 20 samples including method blanks (ML), fortified blanks (FB), LCB, LCB, matrix spikes (MS, SPK), and duplicate whether split or native (MSD, SPK DUP, DLP, LK).

### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA RS ESD) are available upon request. There were no history data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Inert Gas Chromatography - Mass Spectrometry). An initial calibration with at least five levels was used to quantify 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

### Assessment Results

None

### Analysis QA/QC Summary

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None

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### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None

### QA/QC Batch Summary

### Internal Standards

Internal standard areas and retention times met the acceptance criteria with the following exceptions:

None

### Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) were analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) were analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

### Sample Filtration

Samples consisting of compounds at concentrations above the initial calibration curve were filtered and reanalyzed for those compounds. The following samples were filtered for 1,4-Dioxane:

- Real Time 2/21/22
- 1000-10 2/21/22
- TW-23 2/21/22
- TW-29 2/21/22
- TW-14 2/21/22
- TW-17 2/21/22
- TW-18 2/21/22
- TW-24 2/21/22
- TW-25 2/21/22
- PW-1 2/21/22
- D02P12 2/21/22
- TW-21 2/21/22
- TW-19 2/21/22

Mark T. DeLong (Quality Assurance Coordinator) / February 28, 2022

Philip B. Simon (Laboratory Director) / February 28, 2022

Page 1

CHAIN OF CUSTODY RECORD

ATS

Sample ID	Sample Name	Sample Date	Sample Type	Sample Volume	Sample Matrix	Sample Analysis	Sample Results	Sample Comments
1	Real Time	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
2	Concentration	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
3	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
4	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
5	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
6	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
7	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
8	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
9	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
10	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
11	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
12	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
13	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
14	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
15	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
16	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
17	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
18	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
19	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	
20	1000-10	2/21/22	Urgent	100ml	Water	1,4-Dioxane	0.05 mg/L	

### Jim Bradley

From: Trendel, Gage <[gage\\_trendel@ats.com](mailto:gage_trendel@ats.com)>  
 Sent: Monday, February 21, 2022 9:27 AM  
 To: Jim Bradley; Sarah Stubbfield; Mark DeLong  
 Cc: David Stubbfield  
 Subject: RE: Pail COC 2/21/2022

Yes. We will go off of the vial for all.

TW-29 is new, so we don't have any previous data.

### Gage Trendel

Chemist  
 V&V OPERATIONS AND TECHNICAL SERVICES, INC.  
 842 S. Wagner Road | Ann Arbor | MI | 48103  
 C: 916.977.1000 | D: 419.787.5144 | F: 916.977.1005

Confidential - Company Property

From: Jim Bradley <[jim.bradley@annarbortechnicalservices.com](mailto:jim.bradley@annarbortechnicalservices.com)>  
 Sent: Monday, February 21, 2022 9:27 AM  
 To: Trendel, Gage <[gage\\_trendel@ats.com](mailto:gage_trendel@ats.com)>; Sarah Stubbfield <[sarah.stubbfield@annarbortechnicalservices.com](mailto:sarah.stubbfield@annarbortechnicalservices.com)>; Mark DeLong <[mark.delong@annarbortechnicalservices.com](mailto:mark.delong@annarbortechnicalservices.com)>; David Stubbfield <[david.stubbfield@annarbortechnicalservices.com](mailto:david.stubbfield@annarbortechnicalservices.com)>  
 Cc: David Stubbfield <[david.stubbfield@annarbortechnicalservices.com](mailto:david.stubbfield@annarbortechnicalservices.com)>  
 Subject: RE: Pail COC 2/21/2022

Good morning Gage,

We have a few issues with the COC.

Comb. Eff. Sample time on COC 2-25 on sample vial 7-25  
 89-1 sample time on COC 7-25 on sample vial 7-25  
 Sample #14 has a sample name of TW-1 on the COC. We have a sample vial TW-10 with the same date and time, but don't have a sample TW-1.

In the past we have sent with the information on the vials, do you want me to do that in this case as well?

Also do you have previous data on sample TW-29?

Thanks Jim

From: Trendel, Gage <[gage\\_trendel@ats.com](mailto:gage_trendel@ats.com)>  
 Sent: Monday, February 21, 2022 8:53 AM  
 To: Sarah Stubbfield <[sarah.stubbfield@annarbortechnicalservices.com](mailto:sarah.stubbfield@annarbortechnicalservices.com)>; Mark DeLong <[mark.delong@annarbortechnicalservices.com](mailto:mark.delong@annarbortechnicalservices.com)>; David Stubbfield <[david.stubbfield@annarbortechnicalservices.com](mailto:david.stubbfield@annarbortechnicalservices.com)>  
 Cc: David Stubbfield <[david.stubbfield@annarbortechnicalservices.com](mailto:david.stubbfield@annarbortechnicalservices.com)>; Jim Bradley

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ANN ARBOR TECHNICAL SERVICES, INC.  
QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY ACCURACY SUMMARY

Method: USEPA 1631  
QC Batch Number: 00000000000000000000  
ATB Sample ID: 1631-1  
Client Sample ID: 1631-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.4	0.01	0.04	M

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.4	0.01	0.04	M

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

Ann Arbor Technical Services, Inc.  
288 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-995-0905  
Fax: 734-995-3731



ANN ARBOR TECHNICAL SERVICES, INC.  
QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method: USEPA 1631  
QC Batch Number: 00000000000000000000  
ATB Sample ID: 1631-1  
Client Sample ID: 1631-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.4	0.01	0.04	M

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.4	0.01	0.04	M

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

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Fax: 734-995-3731



1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.006	0.001		

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

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1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.34	0.01		

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

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1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.41	0.04		

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

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1,4-Dioxane by GC/MS  
Data Summary Sheet

ATB Project Number: 0001-002-22  
ATB Sample ID: 021221  
Client Sample ID: 1631-1  
Laboratory Sample ID: 021221-1  
Matrix: Water  
Sample Date: 03/16/2022 10:30  
Analytical Method (USEPA): USEPA 1631  
Preparation Method (USEPA): USEPA 1631  
QC Batch Number: 00000000000000000000

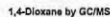
Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.12	0.005		

Comments:  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.  
All results are within the 10% relative standard deviation (RSD) limit.

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Office: 734-995-0905  
Fax: 734-995-3731



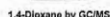


### 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MDL	PGL	Qual
1,4-Dioxane	123-81-1	0.032	0.005		M

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-955-2995  
Fax: 734-955-3731



#### 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MOL	PQL	Qual
1,4-Dioxane	123-01-1	0.02	0.01		M

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, MI 48106  
Office: 734-255-0900  
Fax: 734-255-0731



4.4. Division by CC/M

Parameter	CAS#	Result	MDL	PQL	Qual
1.4.Dioxane	123-81-1	0.70	0.01		M

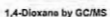
Ann Arbor Technical Services, Inc.  
280 South Wagner Road  
Office: 734-665-0000  
Fax: 734-665-3771



**Author's address:** Department of Psychology, University of California, San Diego, 3541 La Jolla Village Drive, San Diego, CA 92093, USA.

Parameter	CAS#	Result	MDL	POL	Qual
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Ann Arbor Technical Services, Inc.  
200 South Main Street  
Ann Arbor, MI 48106  
Office: 734-935-0391

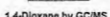


### 1,4-Dioxane by GC/MS

Parameter	CASF	Result	MDL	PGL	Goal
1,4-Dioxane	123-01-1	0.03	0.01		M

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0195  
Fax: 734-665-3731



#### 1,4-Dioxane by GC/MS

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-81-1	0.14	0.005		M

Ann Arbor Technical Services, Inc.  
299 South Wagner Road  
Ann Arbor, MI 48106-1500  
Office: 734-965-0185  
Fax: 734-965-3731

[illegible]

Parameter	CAS#	Result	MDL	PQL	Qual
2,4-Dichloro	450-91-2	0.000	0.000		0

Ann Arbor Technical Services, Inc.  
230 South Wagner Road  
Office: 734-665-0880  
Fax: 734-665-3731



**THE**  
**ALPHABETIC METHOD**

Parameter	CAS#	Result	MDL	PQL	Qual
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Ann Arbor Technical Services, Inc.      Office: 734-995-0989



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-1  
Laboratory Sample ID 022221-1  
Matrix Water  
Sample Date 02/10/22 16  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 13:17:21

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.002	0.001		

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0900  
Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-2  
Laboratory Sample ID 022221-2  
Matrix Water  
Sample Date 02/10/22 17:10  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 15:14:29

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.41	0.04		M

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0900  
Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-3  
Laboratory Sample ID 022221-3  
Matrix Water  
Sample Date 02/10/22 14:54  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 08:38:57

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

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Ann Arbor, Michigan 48103

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Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-4  
Laboratory Sample ID 022221-4  
Matrix Water  
Sample Date 02/10/22 10:01  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 22:44:24

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.002	0.001		

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0900  
Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-11  
Laboratory Sample ID 022221-11  
Matrix Water  
Sample Date 02/10/22 11:26  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 09:27:56

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0900  
Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-12  
Laboratory Sample ID 022221-12  
Matrix Water  
Sample Date 02/10/22 12:40  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 08:11:47

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.002	0.001		

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-665-0900  
Fax: 734-665-3731



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATP Project Number 0001-002.22  
ATP SRS Number 022221  
Client Sample ID 022221-13  
Laboratory Sample ID 022221-13  
Matrix Water  
Sample Date 02/10/22 14:54  
Analytical Method (USEPA) USEPA 1624  
Preparation Method (USEPA) USEPA 1624  
QC Batch Number GC0H0022221

Percent Moisture 100.0  
Instrument 7100V  
Subsample (mL) 5.000  
Final Volume (mL) 5.000  
Dilution Factor 1  
Units mg/L  
Preparation Date 02/22/2022  
Analysis Date 02/22/22 08:05:23

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.01	0.02		M

Comments  
All values are reported as 1,4-Dioxane unless otherwise noted.  
Calculated and verified by the laboratory.  
These results represent the GC/MS method used unless otherwise noted.  
N/A indicates no detectable level of the compound in the sample.

Ann Arbor Technical Services, Inc.  
200 South Wagner Road  
Ann Arbor, Michigan 48103

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# Data Transmittal Cover Page

Project Name: Pall Corporation  
 ATS Project Number: G001-002  
 Client PO Number: Inorg\_SRP\_022321  
 Client PO Number: 450508688  
 Project Description: This data report contains the results of 11 water samples, received by ATS on February 23, 2022 to be analyzed for 1,4-Dioxane.

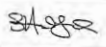
We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratory, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

Recipient: Mr. Gage Trendel Email: gage\_trendel@pall.com  
 FAX Number:

No. of Pages (including cover pg.): 25

From: Sarah Stubbfield Email: Sarah.Stubbfield@annarbortechnicalservices.com  
 Sarah Stubbfield Lab Manager FAX Number: 734-965-3721

Additional Message: Copy report to: Patterson, Keith (keith\_patterson@pall.com), Brody, Jim (jim\_brody@pall.com)  
 Keith Stubbfield (keithstubbfield@pall.com), twocodes@pall.com, Peters, Sue (sue\_peters@pall.com)  
 Amanda Isabella (amanda\_isabella@pall.com)

Date: 2/28/22 Signed: 

IF YOU DO NOT RECEIVE ALL PAGES OF THIS TRANSMITTAL, PLEASE CALL 734-965-0955.

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K:\G001-002\2022\ATS\Transmittal\_Cover\_Page 5.5.1.v1

## ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.22  
 ATS SDG: 022321

Prepared By:  
 Ann Arbor Technical Services, Inc.  
 200 South Wagner Road  
 Ann Arbor, MI 48103

## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002  
 Report Date: 2/28/22  
 SRP / SDG Number(s): 022321  
 Client PO Number: 450508688

### Case Narrative Summary

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and associated matrix-specific QA/QC.

Client Sample Identification	Sample Date	Sample Type / Amount	Analysis	Matrix
Control Blank	2/23/22	Urgent	1,4-Dioxane	Water
Red Pond	2/23/22	Urgent	1,4-Dioxane	Water
Competition (Blank)	2/23/22	Urgent	1,4-Dioxane	Water
HRAC-14	2/23/22	Urgent	1,4-Dioxane	Water
HRAC-24	2/23/22	Urgent	1,4-Dioxane	Water
HRAC	2/23/22	Urgent	1,4-Dioxane	Water
Control Blank	2/23/22	Urgent	1,4-Dioxane	Water
Control Tank	2/23/22	Urgent	1,4-Dioxane	Water
MW-124	2/23/22	Standard	1,4-Dioxane	Water
MW-124	2/23/22	Standard	1,4-Dioxane	Water
MW-124	2/23/22	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

Analysis	Number of Samples
1,4-Dioxane (USEPA 1624) - Urgent TAT	8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
1,4-Dioxane (USEPA 1624) - Standard TAT	3 Samples

G001-002.22\IN\_022321.doc  
 Consultant in Chemistry & Environmental Science  
 200 South Wagner Road, Ann Arbor, Michigan 48103 Tel: 734.965-0955 Fax: 734.965-3721

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample conditions and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

- None

### Data Review and Approval

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedure (SOP) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 25 samples excluding method blanks (MB), fortified blanks (FB, LTB, LCB), matrix spikes (MS, SPS), and duplicates whether split or matrix (MSD, SPS, DUP, DUP, LTB).

### Data Deliverables

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R3 EDO) are available upon request. There were no laboratory data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Inert Gas Dilution Gas Chromatography - Mass Spectrometry). An initial calibration with at least five levels was used to quantify 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as ng/L.

### Automated Blank

- None

### Analytical QA/QC Summary

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

- None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

- None

### QA/QC Batch Summary

### Internal Standards

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

- None

### Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

- None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

- None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

- None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

- None

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ATS

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ATS

CHAIN OF CUSTODY RECORD

Sample ID	Sample Name	Sample Date	Sample Type	Sample Amount	Sample Location	Sample Status	Sample Analysis	Sample Results	Sample Comments
1	Control Blank	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
2	Red Pond	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
3	Competition (Blank)	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
4	HRAC-14	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
5	HRAC-24	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
6	HRAC	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
7	Control Blank	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
8	Control Tank	2/23/22	Urgent	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
9	MW-124	2/23/22	Standard	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
10	MW-124	2/23/22	Standard	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	
11	MW-124	2/23/22	Standard	1,4-Dioxane	Water	Met	1,4-Dioxane	0.00	

### Jim Bradley

From: Trendel, Gage <gage\_trendel@pall.com>  
 Sent: Wednesday, February 23, 2022 12:07 PM  
 To: Jim Bradley; Sarah Stubbfield; Mark DeLong  
 Cc: David Stubbfield  
 Subject: RE: Pall eCOC 2/23/2022

They're 2/22/22.

Gage Trendel  
 Chemist  
 100 V. OPERATIONS AND RESEARCH, TECHNICAL SERVICE, INC.  
 642 S. Wagner Road | Ann Arbor | MI 48103  
 O: 616.977.1000 | D: 419.787.5144 | F: 616.977.1005

Confidential - Company Proprietary

From: Jim Bradley <jim.bradley@annarbortechnicalservices.com>  
 Sent: Wednesday, February 23, 2022 11:31 AM  
 To: Trendel, Gage <gage\_trendel@pall.com>; Sarah Stubbfield <Sarah.Stubbfield@annarbortechnicalservices.com>; Mark DeLong <Mark.Delong@annarbortechnicalservices.com>  
 Cc: David Stubbfield <David.Stubbfield@annarbortechnicalservices.com>; Jim Bradley <jim.bradley@annarbortechnicalservices.com>  
 Subject: RE: Pall eCOC 2/23/2022

Gage,  
 Samples 9,10,11 have a date of 2/22/22 on the COC. And 2/22/22 on the vials.

Would you like to go with dates on the vials?

Jim

From: Trendel, Gage <gage\_trendel@pall.com>  
 Sent: Wednesday, February 23, 2022 10:56 AM  
 To: Sarah Stubbfield <Sarah.Stubbfield@annarbortechnicalservices.com>; Mark DeLong <Mark.Delong@annarbortechnicalservices.com>  
 Cc: David Stubbfield <David.Stubbfield@annarbortechnicalservices.com>; Jim Bradley <jim.bradley@annarbortechnicalservices.com>  
 Subject: RE: Pall eCOC 2/23/2022

Gage Trendel  
 Chemist  
 100 V. OPERATIONS AND RESEARCH, TECHNICAL SERVICE, INC.  
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# ANN ARBOR TECHNICAL SERVICES, INC.

## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: Q00000224201  
SOP: 024201  
Project Number: 0001403.22  
Report Date: 2/23/2022

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Units	Recovery	Method Detection Limit	Reporting Detection Limit	Comments
LRB112447	02/24/2022	10:31:08	1,4-Dioxane	123-01-1	0.00	mg/L	91.7	0.01	0.01	

Comments:  
All results reported to EPA within 10 days of receipt.  
Resubmission performed per 16 CFR 163.10.  
All results reported to EPA within 10 days of receipt.  
All results reported to EPA within 10 days of receipt.

## LABORATORY OPERATIONS CASE NARRATIVE



ATS Project Number: C001402  
Report Date: 2/23/22  
SOP: 024201  
Client PO Number: 40089888

### Case Narrative Summary

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

Sample ID	Sample Name	Sample Type	Sample Size	Sample Weight	Sample Volume	Sample Concentration	Sample Units	Sample Recovery	Sample Method	Sample Comments
LRB112447	1,4-Dioxane	Blank	100 mL	100.00 g	100.00 mL	0.00 mg/L	mg/L	91.7%	USEPA 1631	

These sample results are available for the following analysis:

- 1,4-Dioxane (USEPA 1631) - 100 mL
- 1,4-Dioxane (USEPA 1631) - 100 mL
- 1,4-Dioxane (USEPA 1631) - 100 mL

### Sample Results: Chain of Custody, Receipt, and Holding Times

Samples were delivered directly to ATS by the Client. Samples were received with proper chain of custody documentation. Samples were analyzed and reported. If any, are not reported as "Sample Name" at any time, the sample will be reported as "Sample Name". All samples were properly held and reported within 10 days of receipt.

Comments: See above.

2022-02-23 10:31:08 AM  
Consolidated in Chemistry & Environmental Science  
2022-02-23 10:31:08 AM



# ANN ARBOR TECHNICAL SERVICES, INC.

## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: Q00000224201  
SOP: 024201  
Project Number: 0001403.22  
Report Date: 2/23/2022

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) / On-Going Precision and Accuracy (OPR)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Units	Recovery	Method Detection Limit	Reporting Detection Limit	Comments
LFB112447	02/24/2022	10:31:08	1,4-Dioxane	123-01-1	0.00	mg/L	91.7	0.01	0.01	

Comments:  
All results reported to EPA within 10 days of receipt.  
Resubmission performed per 16 CFR 163.10.  
All results reported to EPA within 10 days of receipt.  
All results reported to EPA within 10 days of receipt.

## Case Narrative Summary

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

A sample was received at ATS on 2/23/22, and analyzed using specific QA/QC. The sample was analyzed and reported. If any, are not reported as "Sample Name" at any time, the sample will be reported as "Sample Name". All samples were properly held and reported within 10 days of receipt.

### Sample Results

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

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# ANN ARBOR TECHNICAL SERVICES, INC.

## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: Q00000224201  
SOP: 024201  
Project Number: 0001403.22  
Report Date: 2/23/2022

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Units	Recovery	Method Detection Limit	Reporting Detection Limit	Comments
MS112447	02/24/2022	10:31:08	1,4-Dioxane	123-01-1	0.00	mg/L	91.7	0.01	0.01	

Comments:  
All results reported to EPA within 10 days of receipt.  
Resubmission performed per 16 CFR 163.10.  
All results reported to EPA within 10 days of receipt.  
All results reported to EPA within 10 days of receipt.

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) / On-Going Precision and Accuracy (OPR)

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

### Matrix Spike and Spike Duplicates

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

### Matrix Spike

This case narrative summarizes the following: a sample was received at Ann Arbor Technical Services, Inc. (ATS) on 2/23/22, and analyzed using specific QA/QC.

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# ANN ARBOR TECHNICAL SERVICES, INC.

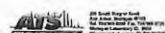
## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: Q00000224201  
SOP: 024201  
Project Number: 0001403.22  
Report Date: 2/23/2022

### Matrix Spike Duplicates (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Units	Recovery	Method Detection Limit	Reporting Detection Limit	Comments
MSD112447	02/24/2022	10:31:08	1,4-Dioxane	123-01-1	0.00	mg/L	91.7	0.01	0.01	

Comments:  
All results reported to EPA within 10 days of receipt.  
Resubmission performed per 16 CFR 163.10.  
All results reported to EPA within 10 days of receipt.  
All results reported to EPA within 10 days of receipt.



## CHAIN OF CUSTODY RECORD

Sample ID	Sample Name	Sample Type	Sample Size	Sample Weight	Sample Volume	Sample Concentration	Sample Units	Sample Recovery	Sample Method	Sample Comments
LRB112447	1,4-Dioxane	Blank	100 mL	100.00 g	100.00 mL	0.00 mg/L	mg/L	91.7%	USEPA 1631	









# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022321  
 Client Sample ID MW-124  
 Laboratory Sample ID 022321-2  
 Matrix Water  
 Sample Date 02/25/2022 7:35  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0223221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.42	0.04		M

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022321  
 Client Sample ID MW-124  
 Laboratory Sample ID 022321-6  
 Matrix Water  
 Sample Date 02/25/2022 8:20  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0223221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022321  
 Client Sample ID MW-124  
 Laboratory Sample ID 022321-10  
 Matrix Water  
 Sample Date 02/25/2022 10:30  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0223221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022321  
 Client Sample ID MW-62  
 Laboratory Sample ID 022321-11  
 Matrix Water  
 Sample Date 02/25/2022 12:35  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0223221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.08	0.001		

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022421  
 Client Sample ID MW-62  
 Laboratory Sample ID 022421-1  
 Matrix Water  
 Sample Date 02/25/2022 14  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0224221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.003	0.001		

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022421  
 Client Sample ID MW-62  
 Laboratory Sample ID 022421-2  
 Matrix Water  
 Sample Date 02/24/2022 7:18  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0224221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.42	0.04		M

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022421  
 Client Sample ID MW-62  
 Laboratory Sample ID 022421-1  
 Matrix Water  
 Sample Date 02/24/2022 68  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0224221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.006	0.001		

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number 0001-002.22  
 ATS BOD Number 022421  
 Client Sample ID MW-62  
 Laboratory Sample ID 022421-2  
 Matrix Water  
 Sample Date 02/25/2022 7:38  
 Analytical Method (USEPA) USEPA 1624  
 Preparation Method (USEPA) USEPA 1624  
 QC Batch Number QCOH0224221

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.26	0.01		M

## Comments

All methods performed per EPA methods unless otherwise noted.  
 Calibration performed prior to testing.  
 Project status reporting per EPA's third-party based calibration standard.  
 All methods performed using EPA's third-party based calibration standard.



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-0	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	45
Sample Date	02/04/2022 11:20	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 16:15:28

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	2.4	0.04		M

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-0	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	10
Sample Date	02/04/2022 13:00	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 16:51:26

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.43	0.01		M

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-11	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	02/04/2022 8:44	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 17:45:24

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.005	0.001		

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-15	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	1
Sample Date	02/04/2022 10:06	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 16:16:28

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.016	0.001		

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-13	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	10
Sample Date	02/04/2022 11:59	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 16:38:24

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.28	0.01		M

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



# 1,4-Dioxane by GC/MS Data Summary Sheet

ATS Project Number	0001-002-22	Percent Moisture	100.0
ATS SDO Number	0276221	Instrument	7100V
Client Sample ID	WW-1	Subsample (mL)	5.000
Laboratory Sample ID	0276221-14	Final Volume (mL)	5.000
Matrix	Water	Dilution Factor	10
Sample Date	02/04/2022 13:30	Seals	Wat
Analytical Method (USEPA)	USEPA 1624	Units	mg/L
Preparation Method (USEPA)	USEPA 1624	Preparation Date	02/05/2022
QC Batch Number	QCON00220221	Analysis Date	02/05/2022 21:21:15

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	1.6	0.08		M

**Comments:**  
 1. All methods performed by ATSL in accordance with the following methods:  
 2. All methods performed by ATSL in accordance with the following methods:  
 3. All methods performed by ATSL in accordance with the following methods:  
 4. All methods performed by ATSL in accordance with the following methods:



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 Ann Arbor, Michigan 48103

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## ANN ARBOR TECHNICAL SERVICES, INC.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: G001032121  
EDG: 6051021  
Project Number: G001-032.22  
Report Date: 3/7/2022

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
032-0214 MS	03/01/2022	16:20:48	1,4-Dioxane	123-61-1	0.402	0.808	1.27	mg/L	94%	0.3	0.7	120

Comments:  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).



## ANN ARBOR TECHNICAL SERVICES, INC.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: G001032121  
EDG: 6051021  
Project Number: G001-032.22  
Report Date: 3/7/2022

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
032-0214 MS	03/01/2022	17:08:26	1,4-Dioxane	123-61-1	0.402	0.808	1.27	mg/L	94%	0.3	0.7	120

Comments:  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).



## ANN ARBOR TECHNICAL SERVICES, INC.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: G001032121  
EDG: 6051021  
Project Number: G001-032.22  
Report Date: 3/7/2022

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
032-0214 MS	03/01/2022	16:20:48	1,4-Dioxane	123-61-1	0.402	0.808	1.27	mg/L	94%	0.3	0.7	120

Comments:  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).

CHAIN OF CUSTODY RECORD



## CHAIN OF CUSTODY RECORD

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
032-0214 MS	03/01/2022	16:20:48	1,4-Dioxane	123-61-1	0.402	0.808	1.27	mg/L	94%	0.3	0.7	120

\* Requested Turn-Around Time Priority Number Key: 1 = Urgent 2 = Rush 3 = Standard



## ANN ARBOR TECHNICAL SERVICES, INC.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY BLANK SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: G001032121  
EDG: 6051021  
Project Number: G001-032.22  
Report Date: 3/7/2022

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
LRB-1 1612	03/01/2022	09:20:19	1,4-Dioxane	123-61-1	0.000	0.000	0.00	mg/L	94%	0.3	0.7	120

Comments:  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).



## ANN ARBOR TECHNICAL SERVICES, INC.

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY  
LABORATORY PRECISION SUMMARY

Method: USEPA 1631  
QA/QC Batch Number: G001032121  
EDG: 6051021  
Project Number: G001-032.22  
Report Date: 3/7/2022

## Laboratory Reagent Blank (LRB) / Laboratory Control Sample (LCS) / On-Going Precision and Accuracy (OPR)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Recovery	Units	Recovery Factor	LOD	LOQ	Qualifier
LRB-1 1612	03/01/2022	09:20:19	1,4-Dioxane	123-61-1	0.000	0.000	0.00	mg/L	94%	0.3	0.7	120

Comments:  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).  
All samples analyzed by EPA method 8260 (GC/MS).



## Data Transmittal Cover Page

Project Name: Pail Corporation  
ATIS Project Number: G001-032.22  
ATIS Client PO Number: 455858088

Project Description: The following is a summary of the results of the analysis performed by ATIS on March 2, 2022. It is intended for use by the client.

Signature: Mr. Chris Timpel  
Title: Project Manager  
Date: 3/7/2022

Signature: Sarah Blalock  
Title: Quality Assurance Manager  
Date: 3/7/2022

Signature: Sarah Blalock  
Title: Quality Assurance Manager  
Date: 3/7/2022

Signature: Sarah Blalock  
Title: Quality Assurance Manager  
Date: 3/7/2022

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Date: 3/7/2022

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Title: Quality Assurance Manager  
Date: 3/7/2022

Signature: Sarah Blalock  
Title: Quality Assurance Manager  
Date: 3/7/2022

Signature: Sarah Blalock  
Title: Quality Assurance Manager  
Date: 3/7/2022





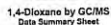










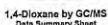
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PQL	Unit
1,4-Dioxane	123-01-1	ND	0.001		U

A4: methods relevant to L5: L5: methods unless otherwise noted.  
 Calculations performed prior to rounding.  
 Percent specific reporting level (NCE) based upon stated laboratory standard.  
 M = indicates observed reporting level based upon sample dilution.

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1,4-Dioxane by GC/MS  
Data Summary Sheet

Paternal	CAS#	Result	MDL	PQL	Qual
14.Duoctus	123-01-1	0.005	0.001		

† All methods reference US EPA methods unless otherwise noted.  
 ‡ Cacti/ferns performed prior to burning.  
 § Present results reporting limit (MCL) based upon lower calibration standard.  
 || - In-house elevated reporting limit based upon within dilution.  
 ¶ Results analyzed at outside lab.

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210 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-925-0929  
Fax: 734-925-7771

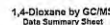
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PGL	Qual
1,4-Dioxane	123-01-1	0.44	0.04		M

Final results reference (3) LPA methods unless otherwise noted.  
Calculation (market) price is rounding.  
Prosed specific reporting first (MFL) based upon lowest substitution standard.  
b - Induction simulated reporting first based upon average market.

Ann Arbor Technical Services, Inc.  
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Office: 734-695-0990  
Fax: 734-695-2731

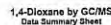
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MGL	PQL	Qual
1,4-Dioxane	123-01-1	0.006	0.001		

22 methods reference (23) (7% accuracy unless otherwise noted).  
Calculations performed prior to rounding.  
Protein specific isotyping limit (3dL) based upon linear calibration standard.  
M = inclusion amount reporting limit based upon sample dilution.  
Example analyzed at various pH.

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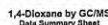
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.46	0.04		M

All methods replicate (31 174 methods) unless otherwise noted.  
Calculations performed prior to rounding.  
Frequent specific recording (not (N/A)) based upon broad categorical domain.  
M = method should recording (not based upon sample edition).

Ann Arbor Technical Services, Inc.  
260 South Wagner Road  
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Office: 734-995-0903  
Fax: 734-995-3731

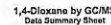
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CASE	Result	MDL	PQL	Qual
1.4-Dioxin	123-01-1	0.006	0.001		

ad methylol reference (1.5 CFN, methylol unless otherwise noted).  
 Calculations performed prior to marketing.  
 (Fytec) specific repeating unit (SRU) based upon known carbonates number  
 14 = Polymer amount repeating unit based upon sample (SRU).

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-995-0090  
Fax: 734-995-3731

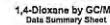
1,4-Dioxane by GC/MS  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	0.02	0.04		M

Adapted from *Journal of the American Statistical Association*, 102(482), 1997, 1025-1032.  
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Fax: 734-225-3773

1,4-Dioxane by GC/M  
Data Summary Sheet

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	ND	0.001		U

†† Indicate second spouting time based upon sample stream.

Ann Arbor Technical Services, Inc.  
290 South Wagner Road  
Ann Arbor, Michigan 48103

Office: 734-996-0900  
Fax: 734-995-3771





# 1,4-Dioxane by GC/MS Data Summary Sheet

**ATS Project Number** 0801-002-22  
**ATS BSG Number** 0304221  
**Client Sample ID** MSN-146  
**Laboratory Sample ID** 0304221-10  
**Matrix** Water  
**Sample Date** 03/03/2022 10:44  
**Analytical Method (USEPA)** USEPA 1624  
**Preparation Method (USEPA)** USEPA 1624  
**QC Batch Number** QCGH0304221

**Percent Moisture** 100.0  
**Instrument** 7100V  
**Subsample (mL)** 5.000  
**Final Volume (mL)** 5.000  
**Dilution Factor** 1  
**Units** mg/L  
**Preparation Date** 03/04/2022  
**Analysis Date** 03/04/2022 15:30:38

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	ND	0.001		U

## Comments

All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.



# 1,4-Dioxane by GC/MS Data Summary Sheet

**ATS Project Number** 0801-002-22  
**ATS BSG Number** 0304221  
**Client Sample ID** MSN-146  
**Laboratory Sample ID** 0304221-11  
**Matrix** Water  
**Sample Date** 03/03/2022 12:45  
**Analytical Method (USEPA)** USEPA 1624  
**Preparation Method (USEPA)** USEPA 1624  
**QC Batch Number** QCGH0304221

**Percent Moisture** 100.0  
**Instrument** 7100V  
**Subsample (mL)** 5.000  
**Final Volume (mL)** 5.000  
**Dilution Factor** 1  
**Units** mg/L  
**Preparation Date** 03/04/2022  
**Analysis Date** 03/04/2022 12:10:55

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	ND	0.001		U

## Comments

All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.



# 1,4-Dioxane by GC/MS Data Summary Sheet

**ATS Project Number** 0801-002-22  
**ATS BSG Number** 0304221  
**Client Sample ID** MSN-146  
**Laboratory Sample ID** 0304221-12  
**Matrix** Water  
**Sample Date** 03/03/2022 13:51  
**Analytical Method (USEPA)** USEPA 1624  
**Preparation Method (USEPA)** USEPA 1624  
**QC Batch Number** QCGH0304221

**Percent Moisture** 100.0  
**Instrument** 7100V  
**Subsample (mL)** 5.000  
**Final Volume (mL)** 5.000  
**Dilution Factor** 1  
**Units** mg/L  
**Preparation Date** 03/04/2022  
**Analysis Date** 03/04/2022 12:54:16

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	ND	0.001		U

## Comments

All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.



# 1,4-Dioxane by GC/MS Data Summary Sheet

**ATS Project Number** 0801-002-22  
**ATS BSG Number** 0304221  
**Client Sample ID** MSN-146  
**Laboratory Sample ID** 0304221-13  
**Matrix** Water  
**Sample Date** 03/03/2022 15:08  
**Analytical Method (USEPA)** USEPA 1624  
**Preparation Method (USEPA)** USEPA 1624  
**QC Batch Number** QCGH0304221

**Percent Moisture** 100.0  
**Instrument** 7100V  
**Subsample (mL)** 5.000  
**Final Volume (mL)** 5.000  
**Dilution Factor** 1  
**Units** mg/L  
**Preparation Date** 03/04/2022  
**Analysis Date** 03/04/2022 13:36:46

Parameter	CAS#	Result	MDL	PQL	Qual
1,4-Dioxane	123-01-1	ND	0.001		U

## Comments

All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.  
 All methods performed per EPA 8160-G guidelines unless otherwise noted.